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JOHN N. DALTON, GOVERNOR

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COVER: Chickadees by Art Lamay, Great Falls

Editorial

ELITISM — A GROWING TREND

We received several letters applauding Will Crisp's story about quality trout fishing in Austria carried in our February issue. It also prompted some people to comment on deer hunting suggesting higher standards for that sport.

With seemingly ever growing masses of people taking to the outdoors in pursuit of game and fish in an ever-shrinking area in which to pursue them, it seems that the quality of the sport must inevitably decline. While it is true that we will probably never again recapture the magic of the days of yore when a man could pursue game on an exclusive basis, there has been and is a distinct trend toward quality.

When my career with the Virginia Game Commission began some 17 years ago the emphasis was on "gold rush" tactics — opening all seasons at the same time so everyone had an equal chance to claim his share of the game. There was a special two week archery season in late October and, of course, a hodgepodge of squirrel seasons designed primarily to make it easier to bag more squirrels.

Since those times have come seven more weeks of bow hunting, four weeks of spring turkey hunting, a special muzzle loading season, an early small game season and a host of other regulations designed to give the specialist hunter the best break at pursuing his game, without having to share the woods with every other kind of hunter at the same time.

On the fishing scene have come catch and release streams, size limits to make fish more of a trophy, and smaller possession limits on our sportiest game fish. Soon we will have more designated high quality trout streams supporting self-reproducing populations. But trout fishing like in Austria? Not likely!

Virginia lies on the periphery of trout range. Most of our streams capable of supporting trout on a year-around basis are small, as are the native trout they contain. Austrian streams, as those in our western states, are fed by melting snows, providing a cold constant flow. Virginia streams must take their luck with fickle summer rains. Low flow and resulting high temperatures are the main reason our streams can't compete with those in Austria.

But the quest for quality continues. Will we some day see deer hunting areas where hunters are restricted to trophy bucks? Chincoteague National Wildlife Refuge already has a trophy buck hunt where only five pointers or better are legal game. The first deer, however, must be a doe for herd control. Who knows what challenges the future holds?—HLG

Letters

BIRD OF THE MONTH

I would like to compliment the "Bird of the Month" feature every month. The stories are well-written and informative and the paintings are always excellent.

M. Newberry
Lynchburg

OUR MISTAKE

The gorgeous photo in your article "Signs of Spring" in the March issue is of an *Amanita Caesarea* mushroom, not an *Amanita Muscaria.*

Marjorie Siegel
Charlottesville

Thanks for catching the error. Yours was the only letter pointing out our mistake.—Asst. Editor

LONG MAY SHE WAVE

Virginia Wildlife *does get around! We received a letter from R. de Treville Lawrence, Sr. from The Plains stating that he had seen in* Country Life *magazine published in England a column describing squirrels as "tree rats." Loyal Virginian that he is, Mr. de Treville Lawrence sent Ian Niall in England a copy of our November article "Squirrel Supreme." Following here is a brief excerpt from Niall's reply:*

"We in England are a very conservatived people, stuffed with ritual. Our minds are closed and you haven't a can opener that can open some of them. We just can't have free-thinking Amerians telling us to eat tree rats. I salute you. I wish I could promise you that I will try squirrel, but I can't. There are some here that think George Washington betrayed his blood, although for my part, leaving out the tree rat, I think America is the best thing that happened in a thousand years."

Many thanks to Mr. de Treville Lawrence for sending Virginia Wildlife *to Britain.—Asst. Editor*

PRAISE FOR VW

I would like you to know how much I enjoy the monthly issues of your magazine. The photography and layout are excellent and the stories down-to-earth and newsworthy. The watercolors by George Shumate in your February issue reminded me of some of the works of Herb Jones, a Norfolk artist.

Dr. J. B. Lapetina
Norfolk

NATURE AND POWER

by Les Hartwig

They can live together.

Dick Byrnes, forestry and soils specialist, has worked with this right-of-way project since its inception. His specialty is in changes in soil composition occuring under the changes in vegetation. (above) As shown here, wildlife habitat can exist in harmony with the power lines necessary to supply our society with electricity. (below)

It was a hot, steamy, mid-August morning when the two scientists reached their work site in the mountains northwest of State College, Pennsylvania.

On this day, the two men spent most of their morning bent over, staring at the ground. One held a small branch in his hand using the tip to scratch at the surface of the soil. The other was making notations in a small pocket-sized book.

Drs. W. C. (Bill) Bramble and W. R. (Dick) Byrnes were in the midst of a wildlife survey on an electric utility right-of-way. They were looking for deer droppings. With this information they could estimate their population and use of the area to feed.

For Bill Bramble, professor emeritus of forestry and conservation at Purdue University, it was another right-of-way project update. It was another chance to add more data to an already burgeoning ecologic file tracing the development of this man-made ribbon of brush winding its way through the Pennsylvania countryside.

A calm, umcomplicated man, Bill Bramble looks like he belongs in a "Norman Rockwell" painting. At age 69, his easy-going, gray-haired manner disguises his inner energy.

He's dedicated to the betterment of wildlife's habitat. As a conservationist and forester, he's also dedicated to progress and sound management of our nation's forested lands. These dual goals have made Bill Bramble a master of industrial/ecologic compromise. His work with the electric utility right-of-way projects in rural Pennsylvania serves to illustrate his goals.

Bramble says two objectives have been met at the right-of-way project near State College. "First, we've shown that the selective use of herbicides to remove only target brush species is feasible. And secondly, we've shown that by studying and knowing the results of our actions, we can successfully prescribe a change that will improve the total environment."

Though Bramble has been a key figure in the environmental research on the right-of-way, he hasn't done this work alone. Dr. Byrnes, a Purdue University forestry and soils specialist, has also worked with the State College project since its beginning. Dr. Byrnes has worked in all phases of the research project but has specialized in studying changes in plant composition and soil conditions on the the right-of-way.

Both Bramble and Byrnes have been studying the effect of changing a plant cover containing tall woody plants to one dominated by low-growing shrubs at this location for the past 24 years.

"I've spent so much time here on this mountain, it feels like my backyard." Bramble says. "Just look how mountain laurel, native fern and witch-hazel provide browse for whitetail deer, and shelter for grouse, rabbits and wild turkeys."

Byrnes walked down the right-of-way. He yelled back, "Here's a deer bed!" Bramble, interpreting, says "They're one of the signs we use estimating how often a right-of-way is being used by wildlife. As we changed the environment, sedge was one of the plants that increased, and it offers deer a favorite bedding spot."

Moving off the right-of-way and into the shade of larger trees along the edge, Bramble explained their project. "We began our research back in 1953. That was long before words such as environment and ecology came into common use. Using herbicides to control large woody plants, now so essential on electric power transmission lines, was something new. The Pennsylvania electric companies were anxious to learn what effect changing the environment by controlled use of these chemicals would have on wildlife, its food and cover. From our experience, we can only conclude after all these years that on balance, the birds and animals are better off because of the diverse habitat and the utilities use of research efforts."

Particularly deer! The low, dense vegetation provides ideal cover for hiding fawns; certainly much better than do the tall hardwoods with sparse undergrowth bordering the right-of-way. The scientists have files of pictures to prove it. "And one day," says Bramble, "I was pretty certain there was a deer up ahead of me in the low brush. We met almost head on at the top of a ridge. That buck stopped and stomped his feet and looked at me while I clicked off about a dozen pictures. I was in real luck getting pictures of a buck in velvet with lots of food and cover on the right-of-way. He'd been eating blueberries."

The human species, too, likes those blueberries that the changing environment has brought to many areas on Pennsylvania transimission right-of-way. "And few sights are more beautiful to nature lovers than those long vistas of mountain laurel when in full bloom," Bramble observes. Common land usage traditionally limits such gorgeous views; not so on these almost endless miles stretching as far as one can see, mountain laurel and more mountain laurel!"

"See that hill?" questions Bramble as he points. "We flushed nearly 20 turkeys from that ridge one day when we were over here. They find much better insect and plant food here on the right-of-way than they do in the forest on either side, and there's plenty for them to eat." A feather here and there gave proof of their recent presence.

Since white-tailed deer play such an important role as large game animals on the Allegheny plateau, special attention was given from the beginning, Bramble advises. What effect does a right-of-way have on them? "Deer use in the forest averaged 22 deer days per acre in 1972 and 36 deer days per acre in 1973. This compared with 45 and 65 deer days per acre on the right-of-way for those same years."

If you'd like to know exactly what deer eat, Dr. Bramble and his associate can tell you. They have studied how deer eating habits on the right-of-way compares with their food intake in uncut forests. "Deer heavily utilize such common herbaceous plants as braken, goldenrod and loosetrife which come in on rights-of-way where unwanted plants are controlled with herbicides. Bracken is a favorite in spring and early summer when it's young and succulent. Other herbs are browsed during the growing season, and their basal leaves eaten in winter when not covered by deep snow," Bramble says.

Most of us take electricity for granted and seldom stop to realize that the transmission lines with their towers of many shapes and descriptions stretching to points far beyond the horizons are absolutely essential for keeping current flowing into our homes or places of

business. It is conservatively estimated that some 50 million acres in the United States are maintained for transmission of electricity, fuels of various sorts and transportation — all falling under that broad "utility" classification.

There's more to right-of-way maintenance than you might think. As one utility man explains, "Assuming we have all the permits needed to build a new right-of-way through a wooded area, our first step must be to remove the trees. The problem, of course, is that these trees won't stay 'removed'. Old Mother Nature steps in to have her say. The root systems of the trees we cut are as huge and vigorous as ever and before the end of that first growing season some of those stumps will be supporting regrowth higher than my head. If we don't do something, we'll have trees back up into our lines."

By encouraging low-growing species of plants, rights-of-way are supporting large and small animals, and both game and small birds.

Until the early 1950's the ax and saw were the only tools for keeping these resprouting trees cut back to size. It was an expensive and seemingly endless operation. Those old root systems persistently shot up new growth. Then Amchem Products, Inc., introduced plant hormone type herbicides such as 2,4-D and 2,4,5-T, making brush control possible. Selective woody plant control has arrived.

To face the unknowns accompanying this new approach, Amchem and The Asplundh Tree Expert Company, joined forces with the Pennsylvania Electric Company. They asked Dr. Bramble, then professor of forestry, at the School of Forest Resources, Pennsylvania State University, to study what effect changing the plant cover has on the environment.

The greatest beneficial effect of herbicide use has been the creation of a diverse plant population. By encouraging the growth of a wide variety of low growing species, rights-of-way are supporting large and small animals, and both game and songbirds. Bramble, Byrnes and others are finding constant proof of this by checking droppings and other indicators. It has been a case of manipulating vegetative growth for man's benefit as well as wildlife's.

The scientists are going even further in their studies. They want to know what this does to the soil? Does changing the environment improve or harm it? So while Dr. Bramble places emphasis on the influence on animals and birds, Byrnes digs down into the leafmold to learn what changes may be taking place in the underlying soil.

As he explains, "We want to know how the soil properties, the organic layers, are being affected. Let's say we have certain organic layers in the woods over there. All you have to do is walk in there and see the leaf litter, the twigs, branches and fruits that make up the litter layer. We have people who think that when we open up these areas, we let in more rainfall and higher temperatures that will destroy the organic layers. Admittedly, we do have changes in the organic layers. In forests, hardwood leaves make up most of the organic layers. On a right-of-way, it's made up of leaves, twigs and branches of low growing shrubs and grasses. But there's still an organic layer doing a very good job protecting the site, reducing runoff and preventing erosion. So we have a good protective cover. Kick it with your foot and you'll see what I mean, or reach down and grab a handful. You'll find that essentially organic layers on a right-of-way are the same as in the adjacent undisturbed forest."

Dr. Bramble says that in his studies relating to the use of herbicides on utility rights-of-way, he has found that common game species including white-tailed deer, ruffed grouse, wild turkeys and cottontail rabbits, have been using sprayed rights-of-way after spraying, and then continued using them regularly for both cover and food. The deer population, in particular, has been consistently high.

He reports a variation in early vegetation following broadcast herbicide applications compared with more selective treatments. The broadcast sprays bring about a temporary fireweed stage or a grass-sedge cover as compared with the undisturbed bracken-sedge-herb-blueberry community following selected treatment, or in unsprayed control areas. However, all treated areas eventually developed the same general plant community as a low ground cover.

According to Dr. Bramble, "Several plants not common in the undisturbed forest invade the right-of-way to become a dominant part of the low plant cover 15 to 20 years after the original spraying. Important among these are sweetfern, goldenrod and blackberry, all of which began as very sparse plants occurring singly in 1953 and developing into numerous plants or patches of high cover value in recent years. These new invaders partially overtop the bracken-sedge-herb-blueberry community which is typical low cover on all treated areas."

Most impressive, after seeing and reviewing the studies by Drs. Bramble and Byrnes, is that utility right-of-way can exist so well in harmony with nature. Their far reaching corridors create openings through thousands of acres of woodlands where sunlight stimulates production of ground cover and shrub vegetation. The resulting low plant growth is of tremendous value for the preservation and propagation of wildlife.

BLUE GILL
It is as easy as it looks.

BY BILL WEEKES

For more than 40 years Raymond Ramsey and Sol West, natives of Marshall, North Carolina have slapped lake and stream waters of the western Carolinas, Tennessee and Virginia with about every artificial and live bait one could name. Fishing buddies since the days of the Great Depression, they have hooked enough small and largemouth bass; brook, brown and rainbow trout; muskies, wall-eyed pike, crappies and blue gill to fill at least a few moving vans.

This prominent piscatory pair is wedded to the intimacies of such lakes as Fontana, Hiwassee and Appalachia in North Carolina; Douglas and Cherokee in Tennessee; Kerr Reservoir in Virginia; and Clark Hill, Hartwell, Keowee and Jocassee in South Carolina.

Their success has been acknowledged by their appearance in five outdoor motion pictures produced by Madison Productions in New York. Their angling talents have been depicted in such films as "Tar Heel Wildlife" and "Bay at the Moon."

The 65-year-old Ramsey was a North Carolina game warden for nearly 29 years before he retired five years ago. The 62-year-old West, formerly a shipping stockman for a carpet yarn firm, turned to full time angling just a few years ago.

Now they spend nine months of the year following the shorelines of whatever lake they take a notion to invade. These days much of their effort goes toward ferreting out the blue gill. They have discovered that when all other freshwater species have played out, they can rely on this handsome pan fish to keep the action going.

In this interview, Ramsey describes a sure-fire technique for putting a mess of bream on the table.

Question: Just how successful have you been in catching blue gill?

Ramsey: I catch the limit just about every time I go out. I fish for blue gill now more than I ever used to.

Question: Why is that?

Ramsey: They're a lot of fun to catch and you don't have to work as hard to get them as you do with, say, a bass. Many times I get the limit by noon. Sometimes it's good fishing around 2 and 3 o'clock when the shade starts coming on. I find that during times when the bass fishing slows down, the blue gill fishing picks up.

Question: What bait and what rig do you use to catch blue gill?

Ramsey: I used to use a tiny clear Torpedo plug until about six years ago when I started fishing with a Popper

Bug, put out by Gaines. I use a Mini-Popper with a No. 8 hook. You can't hook blue gill with a No. 10, it's too small. I'm not sure, but I don't think many fishermen use this set up for blue gill. Then I use a clear plastic float, or bubble, which I tie about 18 inches from the bug. The float gives the line the weight I need to cast the Popper.

Question: How heavy a line do you use?

Ramsey: I always use a 6-pound Stren test line except when I fish Jocassee. That lake's polluted with bass. They'll grab my Popper or float and pull it down into the brush. On Jocassee I'll use a 10-pound test. But with the lighter line you can cast further.

Question: You say that bass will grab your plastic floater?

Ramsey: Oh, I've had all sorts of 2-pound bass grab the bubble and run with it. In fact, last year I bought a plug that looks like this bubble. I haven't tried it yet, but I know it'll work. In fact — and I know this will sound like a tall tale — last July I caught a 1-pound bass on the Popper and a 1½-pound bass on my float at the same time. The bass somehow got the bubble stuck in its gills.

Question: Are there Popper Bugs for bass too?

Ramsey: Oh yes, you've got the larger Popper for bass and the smaller ones for the blue gill. I always carry Poppers for the bass too. Everytime I go out I carry four rods rigged for both kinds of fishing. One's rigged with a top water plug, one with an underwater plug, one with a plastic worm, and one with a small Popper. My two favorite types of fishing are blue gill on a Popper and bass on a top water plug.

Question: What kind of shoreline do you look for when you're going after the blue gill?

Ramsey: Well, I keep to the clay banks and rocky shores, and I've found they'll hit under overhanging trees. I'll try to stay off the bank about four feet — if you get too close to the shore you get the real small fish.

Question: How should you present your Popper to the blue gill?

Ramsey: First of all, I use a spinning reel and wind the float up to where it's about a foot below the tip of the rod. I pull the baler back and hold the line with my middle finger before I cast. When I cast, I drop the bug so that it lands behind the bubble. This takes a little practice. If you can't do this, then simply pull your line a little until the float has moved away from the bug.

Question: How does a blue gill go after the bug? When should you set the hook?

Ramsey: The blue gill will go after the bug slowly, so you have to be quick to jerk the line and set the hook. That's why it's important to keep all the slack out of your line. If you don't, you'll lose the fish every time. You wait to see a little splash under your bug. You don't wait for the bubble to go under. The bubble's just to give weight to your line, that's all. Of course, many times the blue gill will strike as you're reeling in.

Question: How often do you cast the bug, or do you just let it sit there until you get a strike?

Ramsey: Oh, you don't wait too long. You're moving all the time with the electric motor. I don't work the Popper. I just let it lie there on the water about five or ten seconds and if I don't get a hit, then I reel in. A blue gill will lose interest in what caused a splash after a few seconds.

Question: How do you rate blue gill as an eating fish?

Ramsey: I rate it tops, even above the wall-eyed pike and smallmouth bass. I fillet them and my wife fries them. She mixes a cup of Bisquick mix with a half-cup of corn meal, and add a tablespoon of vinegar with enough buttermilk to make the batter real thin. She dips the fish in this and then fries them. Of course, deep frying gets the best results.

Nature Crafts

BY POLLY T. LINDSEY

Make flowers from osage orange to decorate your home.

We cannot all be artists, sculptors or famous craftsmen, but those of us who enjoy creating objects of beauty from Nature's storehouse have a never ending supply free for the taking. The harvest is replenished by the changing seasons.

It is a real challenge to create something from something which has never seemed to be of any value. Such as the fruit from the osage orange tree. It is inedible for man or beast, it litters the ground wherever it falls — and if you are unfortunate enough to be under a tree when the wind is blowing and one falls on your head, you will see stars!

Now with a little effort you may turn this good-for-nothing fruit into realistic flowers which will last indefinitely. Follow the steps below:

—Pick the fruit when mature in the fall (preferably from the ground if you don't want a knot on your head!)

—Slice approximately 1/8 - 1/4 in. thick with a serrated blade knife or an electric knife. Use foil underneath as the fruits excrete white, sticky juice when cut.

—Also cut small pieces of the skin from ends of fruit to be used as centers for your finished flowers. You may wish to clip or score the edges of some slices to create a petal-like effect.

—Bake the slices on a foil covered cookie sheet in an oven 250 degrees or under. The lower heat will require longer baking. Check closely and turn slices when desired color is reached. Colors will vary with time you leave fruit in oven, also by degree of heat. Muted shades of cream, dark rich browns and light tinges of green will result. If you want a cup-like finished flower place some in muffin tins. These are nice as a center for a larger flat flower.

—If you want to wire the stem from a hole in the center — punch it before baking. I prefer to attach from the back of the flower. To do this I use braided wire, clip the sheath covering until you see 5 tiny copper wires. Carefully separate these and spread apart. They may be used as a bell-cap. Generously apply glue mixed with cotton to the reverse side of the flower then press the spread wires tightly into this. At the same time add more cotton not quite so wet with glue. Wrap tightly around forming a receptacle or torus (the enlarged part of a living flower stalk.) Keep wrapping with cotton until you have a natural looking tapered approach from the stem to the flower. Let this dry. Next wrap all with green floral tape beginning where the receptacle has been built on to the flower and on down the stem.

—Leaves may be cut from green garment leather, thus making it a completely natural project. The rich lustre of leather tends to complement the overall effect. Some grades, such as moccasin leather, will be heavy enough to use only one piece per leaf. Taper the stem end quite narrowly, add small amount of glue to adhere to stem and wrap with floral tape. However, with garment leather you will need to cut two pieces for each leaf — or use a fake suede cloth the same color. Apply glue to the flesh sides of the leather leaves, press a flat twist-tie between them from tip of leaf extending about 3/8 in. past stem end. As you wrap the tape on the wire stem place a leaf and wrap tightly with tape.

—For flower centers use dried seeds, pods, acorn cups, acorns or balls from the liquid amber tree. Any natural material will suffice as long as it adds to the bouquet. I leave some flowers plain, showing the lovely fibrous design emanating from the core of the fruit.

To construct the cactus "vase" one can readily see that it was made by the Master Craftsman! It has been fired in the furnace of the elements — the burning heat of the desert. The hot winds and the shifting, moving, blistering sands. Man with all his

prowess cannot surpass its rustic beauty.

The osage orange tree is also called hedge apple which derived the name from early pioneers who planted it close together to form a living fence. This was a protection from wild beasts, as it has thorny twigs. The yellow wood is strong and durable and was used for fence posts after barbed wire came into existence. The hubs and rims of wheels for buggies were also made from this wood. It is also known as Bodark from the Spanish Boisd 'arc or as Bowwood. The botanical name is *Maclurapomifera.* It originated in the bottomlands of the Arkansas and Red River Valleys in the land of the Osage Indians. It is now found in most parts of the country. Its inner bark is used in leather tanning and also yields a yellow dye which the Indians colored their blankets with. Its flexible wood is prized by archers for bow-making, hence the name Bowwood.

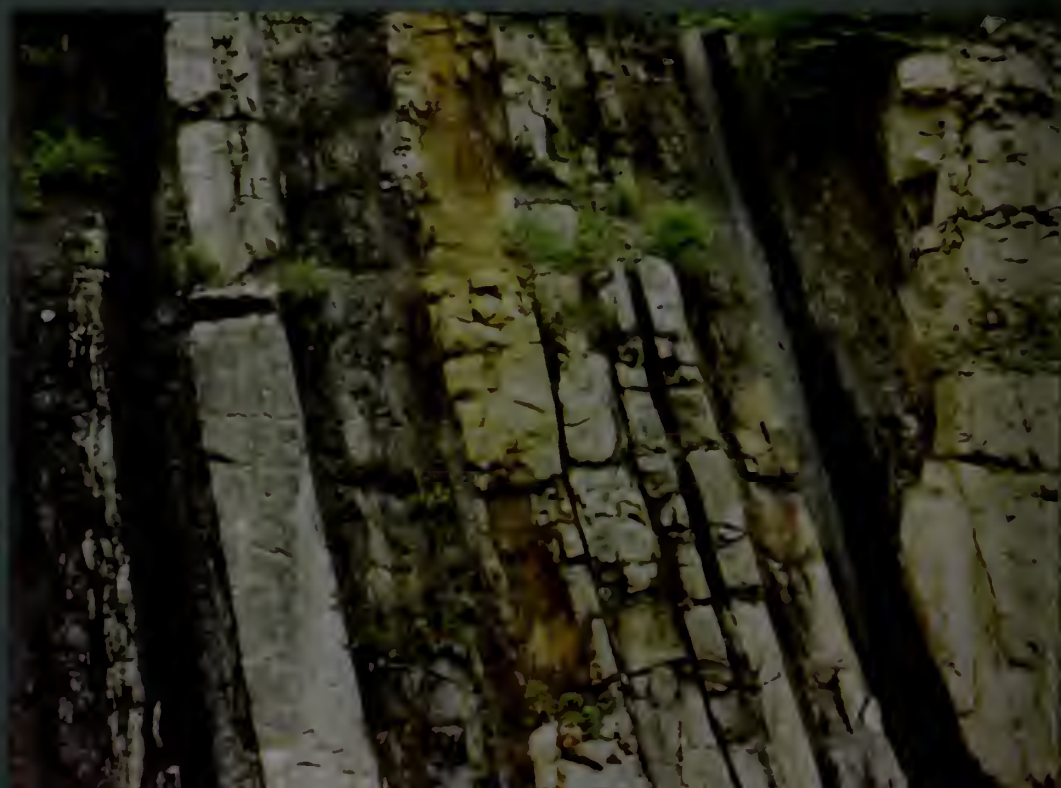
It is a member of the mulberry family. In late summer the pistillate blooms form yellowish-green balls which mature in the fall into compound fruits three to five inches in diameter.

I once made flowers from this fruit 16 years ago and sold all I could produce. They make lovely gifts thus helping you to survive in this day of inflation!

Stone Mountain

Amid the coal fields of Appalachia lies this handwork of nature.

BY DENNIS ANDERSON



The mountain (above), though seemingly barren, supports its own variety of plants and wildlife. The different layers involved in the formation of Stone Mountain can be seen here. (right) Shale, sandstone and coal are all visible in the cliffs of the mountain.

Stone Mountain. Unique. Beautiful. A gem among the ridges of the Cumberland Mountains.

From its inception, the mountain was unique. Sandstone, shale and coal comprise the mountain — the same strata that lies in the coal fields found in the surrounding southwest Virginia lands. When the mountain was created, pressure was exerted and a layer of this strata was thrust upward to relieve the mounting pressure. This layer of bedrock was pushed upward and came to rest in a vertical, rather than a horizontal position. Thus, the mountain was formed.

As time passed, all but the sandstone was weathered down. Along with pressure exerted from growing plants and freezing water, acids were formed. From the air, water and elements in the rocks and dirt, these acids began to chemically break down the huge boulders forming the mountain.

The stone cliffs remained.

Stone Mountain is a sandstone ridge which spans some 60 miles from Cumberland Gap in Lee County to north of Big Stone Gap in Wise County. Many of its picturesque gaps and outcrops are shown in these photos.

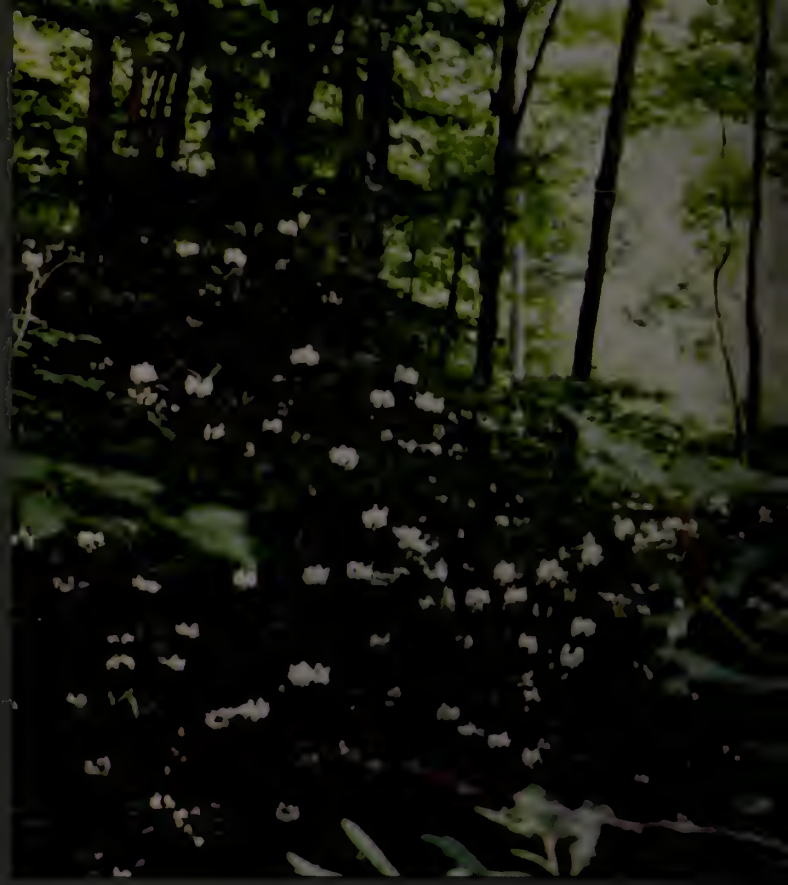
Jacksonflowers (above) grow in profusion on Stone Mountain. They are among the plants that find a home on the rocks of the mountain. The land surrounding the mountain is rich in coal. (below) The scars of strip mining can be seen from atop Stone Mountain, sight not uncommon in southwest Virginia.

Several species of plants and animals survive in these cliffs. Blueberries grow abundantly along the top of Stone Mountain, producing large crops of edible berried. One rare wildflower that grows in quantity is the ladyslipper.

Where broken boulders have collected, too, bobcat, groundhog, raccoon, rattlesnake and timber find a place of shelter. Where the sedimentary conditions are weakly bonded, pockets have been eroded by water to form sand caves also used by animals. Although these small caves are usually damp, they are home to salamanders.

Beside the rock outcrops, Stone Mountain has deep lush coves common in the mountains of the area. There yellow poplar, basswood and hickory grow. Also solomon's seal, trout lily, wood anemone and bloodroot bloom here. Ginseng thrives in this environment.

Though seemingly barren, Stone Mountain is home to many. It, too, has a place in the natural scheme of things.



Few humans have walked this path where the [illegible] nature lovers. (above) The [illegible] to photographers. (below)

Photo by Spike Knuth

Channelization: its impact on wildlife

BY ROBERT LOCHMILLER, JAMES WHELAN, AND MORRIS MAUNEY

Following the torrential flooding caused by hurricane Agnes in 1972, Virginia was subjected to extensive channelization of its streams in an attempt to prevent future damage to roads, bridges, and private property. Simply stated, channelization is a flood protection program whereby streams are molded into straight, widened passageways for the fast removal of surface waters from the watershed, thus reducing the frequency of flooding in the flood plains and marshy wetlands.

In the process of channelization, the riparian (bank of a stream) and stream habitats are modified. The existing stream channel is widened and deepened during the process, forming a straight drainage ditch. Dredging spoils are often piled on the stream banks and formed into levees. Earth-moving heavy equipment is used to remove riparian vegetation during the operation. Trees and shrubs are removed up to distances of 20 to 100 feet on either side of the stream channel. The direct result of this activity is a decline in fish and wildlife populations.

Stream channelization reduces the structural diversity of both stream and riparian habitat. Loss of streamside vegetation causes an increase in water temperature. Increased turbidity (muddiness) and siltation are additional problems that effect many streams due to the erosion of stream banks following channelization. Recent scientific investigations have shown that the process of channelization results in significant declines in both the diversity and abundance of many wildlife species. Nesting habitat, cover, and food supply for squirrels, wood ducks, fur bearers, song-

birds, and many other forms of wildlife are reduced or eliminated by the loss of riparian habitat.

Birds are more sensitive to channelization operations than many other species of wildlife. Riparian habitats harbor some of the most productive avian aggregations in North America. Many birds which breed in riparian habitats are exclusively dependent upon these areas for reproduction.

Streamside vegetation is usually luxuriant and provides high quality habitat for most songbirds. Destruction of streamside habitats has its most profound effect on birds during the critical period of nesting. Parent birds are required to supply large volumes of food to their young during this period and young birds must have ideal habitat in which to learn how to capture food items. Loss of the streamside vegetation results in poor cover and feeding habitat for these birds.

The cost to wildlife can be immense.

Studies have consistently shown that birds are more abundant and diverse on natural streams in comparison to channelized streams; and this difference is greatest on those streams which experienced the greatest loss of stream bank vegetation. Warblers and vireos, in particular, are very sensitive to streamside vegetation removal. A recent study in Virginia revealed 72 red-eyed vireos and 108 Parula warblers breeding on a natural stream and none breeding near a stream three years after channelization.

In contrast to the warblers and vireos are the hummingbirds and swallows which appear to be unaffected by channelization. Following the loss of the streamside vegetation, a lush growth of flowering plants such as primrose, mullien, and goldenrod occurs. These plants offer an excellent food source for hummingbirds, while the swallows enjoy the freedom of flycatching over these open areas.

Mammals, too, are adversely affected by the process of stream channelization, due primarily to the destruction of streamside habitat. The degree to which mammals are affected by channelization depends in part on their method of food gathering and their diet.

Small mammals such as jumping mice and shrews appear to be most affected by channelization as the channelized streams fail to provide sufficient food sources for these species. In contrast, white-footed mice, which eat a wide variety of food items, recover quickly after channelization.

Furbearers are also often affected by channelization. Many trappers reveal poor catches along channelized streams and so prefer to trap the more productive natural streams. A study conducted on a Minnesota watershed revealed an estimated loss of 9,000 muskrats after channelization. Another study conducted in Tennessee estimated a loss of approximately 95 percent of the furbearers on a proposed channelization project. Squirrels and deer also prefer the more abundant food and cover supplies offered to them on natural riparian habitats.

As might be expected, the impact of stream alterations on fish population is pronounced. In some areas, reduction up to 90 percent have occurred both in weight of game fish per acre and in the number of game fish of catchable size following stream channelization. Some streams reportedly take as long as 50 years to return to their original condition following channelization.

Channel alterations can have profound effects on trout populations. Peters and Alvord of Montana found 5½ times as many trout on natural channels as in altered stream channels.

Excessive siltation from stream bank erosion and rapid water fluctuations contribute to the declines in fish populations following channelization. With vegetation removed, the water temperature often rises to a point where it becomes intolerable to many game fish; the end result being smaller, less desirable species of fish replacing the desired game fish.

Channelization clearly alters the delicate ecological balance of an area. This modification is often temporary, but much too often streams and adjacent wildlife habitat may be permanently modified. Streams can be rendered essentially sterile by channelization. Excavation of a channel destroys sources of food and shelter for fish and disrupts the important food chains which exist with terrestrial organisms. When the vegetation is removed from the stream banks, the productivity of the area declines and the wildlife which depend upon this vegetation for food or shelter either leaves or dies.

Most state and federal agencies have recently modified their use of channilization limiting it to areas where there are no other acceptable alternatives and then trying to minimize its adverse impact.

Unfortunately, on private lands, stream channelization continues with few safeguards to prevent habitat destruction. No one appears to know the extent of channelization in the state of Virginia. In the past, the Corps of Engineers, Tennessee Valley Authority, Virginia Department of Highways and Transportation and the Soil Conservation Service of the U.S. Department of Agriculture have been involved in channelization as have private landowners, developers, and local governments.

Biologists at Virginia Polytechnic Institute and State University are presently working to answer the many questions surrounding the controversy of stream channelization. There is still much to learn as to the total impact on the native fauna before sound management decisions can be made regarding possible alternatives to stream channelization.

Personalities BY FRANCIS N. SATTERLEE

Gary R. Dalton

In Mecklenburg County, where Gary was born, his father farmed 400 acres, most of which was in tobacco. In this atmosphere of living with the land and wildlife, Gary grew up influenced by both his father's and his grandfather's love affair with hunting, fishing and the outdoors. When he was but 10 years old, he was allowed to "squirrel hunt," but only in the company of adults. Gary recalls that he and his brothers and both his father and grandfather all hunted and fished "considerable" when the tobacco harvest was in. During the summers, Gary and his brothers worked on the farm, received wages for their labors and thoroughly enjoyed the rural way of life.

After graduating from Bluestone High School in Skipwith, Gary enrolled in Southside Community College in Alberta. During the two years that he attended the College, he majored in Agriculture Business Technology. He continued to live at home during this period, commuting each day and helping on the farm on weekends.

Learning of an opening with the Game Commission in June of 1972, he applied for the job as Game Refuge Supervisor on the 1,300 acre Elm Hill tract in Mecklenburg County. His farm background, his knowledge of wildlife and his formal training all spoke well for him and he was hired for the position the following month. He remained at Elm Hill until July of 1976 when he was transferred to become the supervisor of what was then called the Rappahannock Wildlife Management Area in Fauquier County. In formal ceremonies, held July 30, 1977, the RWMA was renamed as the Chester F. Phelps WMA in honor of the Executive Director of the Commission of Game and Inland Fisheries. In attendance for the ceremonies were a large number of dignitaries, including the Governor of Virginia, John N. Dalton.

As supervisor, Gary is responsible for all activities on the 4,700+ acre area which is located on the Rappahannock River near the community of Sumerduck. The activities include the hunting and fishing which is open to the public, monitoring the cooperative agreement which is in effect with a contract farmer, and a variety of other projects involving the management of that large a tract of land.

Gary feels that the most satisfying aspect of his job is the pure joy of being outdoors with nature and things wild, farming and the ever-present and rewarding contact with sportsmen and women. He is married to the former Susan Marks from Clarksville, Virginia. They make their home in the manor house, which predates the Civil War, that is situated on the Wildlife Management Area some eight miles from Remington.

Diary of a Spring Gobbler Hunt

BY JUANITA COLVIN

WHY GO THROUGH THE FRUSTRATION OF MATCHING WITS AGAINST THE ELUSIVE TURKEY?

April 4, Tuesday

We took an early morning hike to scout for turkeys. The temperature stood at 38 degrees when we left home; the moon a bare sliver in the sky as we reached the Goshen Wildlife Area, necessitating the use of flashlights. As we walked up an old logging road, we could hear soft movements in the surrounding woods. The red eyes of whippoorwills reflected in our light beams.

We walked on for about two miles. Raccoon and deer tracks speckled the road, evidence of earlier sounds. The drumming of a grouse announced the approaching dawn. A woodpecker hammered fervently, beginning his daylong search for food.

Upon reaching our preplanned destination, we sat quietly and listened, but to no avail. We tried gobbles, yelps, and some pleading mating calls but received no answer.

Turkeys had always used this area, but after three successive scouting trips this year, we had found no tracks or any evidence at all of turkeys.

Were they just not talking or were we hearing the silent aftermath of an extremely vicious winter? I guess we'll know by the end of spring gobbler season.

April 5, Wednesday

We changed our territory and left early to scout another mountain several miles away where we had spotted turkeys in previous years. As we left home, the 58 degree temperature belied the fact that we had just been through one of the worst ice storms in the history of this area only eleven days ago.

Now, spring was evident everywhere. As we walked up a deep hollow toward the top of the mountain, we passed myriad clusters of spring garlic. The delicate white flower of the bloodroot peeped at us from the shade of a large, old oak. Small green leaves on the low brush reached hungrily for the rising sun. The only evidence of the ice storm was some large uprooted trees and the bare tops of others, halved by the weight of the ice.

As always, nature was healing herself. In the infancy of their life, small buds had sprung forth as if to declare that soon they would cover all the damage of winter.

We were so engrossed in the spectacle of spring that the first call of a gobbler nearby startled us. Then another. And another! They were completely wrapped up in the act of communicating their quest for hens and had come dangerously close to us in their carelessness.

We hid where we were, and my husband took out his diaphragm mouth call. He began crooning the soft, answering mating yelp of a hen. Moments later, three turkeys flew down the mountain, landed below us, and began a noisy parade up the ridge — each trying to outdo the other with "gobbles" and "clucks".

Then five hens flew in above us, anxiously answering the three gobblers. My husband pleadingly called again, and yet another gobbler flew right over us, landing a mere fifty yards or so away, and running toward us with his young half-learned "gobble" breaking into a coarse yelp.

These were all last year's birds, and in the adolescence of their lives, they were "into it" in full swing!

April 15, Saturday

First day of gobbler season! The excitement of it was running rampant through my nervous system!

I had to work from 11 p.m. Friday night until 2:30 a.m. Saturday morning, then drive thirty miles home to get dressed, and about fifteen more miles to turkey territory. It was terribly hard to keep my mind on work and off the clock, but it soon passed and I was homeward bound! All my clothes, equipment, and a checklist had been carefully laid out Friday to save time.

Finally, my husband and I were dressed and on our way. Upon arriving at our camp, it was still good and dark. Flashlights in hand, we headed up the mountain and settled in to wait for the early morning gobble of Old Tom leaving his roost.

I nestled down in the branches of a large tree that

had blown down, and my husband did the same about 60 yards away. As dawn slowly broke over the mountain, I casually glanced around — and there in a tree not thirty yards away sat a turkey. This long neck strained in my direction, trying to figure out what I was doing there invading his private domain!

But, was it a hen or gobbler? No amount of coaxing could get a peep out of him and I couldn't see well enough to spot a beard. So there we sat — each waiting out the other.

Suddenly, the silence was shattered by a loud gobble. About 125 yards away, high up in a tree, sat another turkey — leaving no doubt as to his gender. Now for the big decision. Should I wait this one out close by and see if he was a gobbler? Or should I wait until both left the roost, and try to call one of them in? I decided on the latter.

Finally, both birds left the roost, and we were unable to call either of them back. When the "close in" turkey flew, we were almost certain it was a tom.

Oh, well. We'll be back Monday, you can bet your life on that!

April 17, Monday

Once again, we headed up the mountain; only today we went one ridge farther over, as we had a better view down the mountain. We sat about 100 yards apart and waited.

The silence was broken sharply by the hoot of a great horned owl (a good imitation by another hunter). He was answered by a loud, irritated gobble from a turkey roosting just below. However, the hunter pursued the bird so hard with his "hooting" that the turkey left his roost and headed in the opposite direction, thus muffing my husband's chances.

In the meantime, I had heard one at the top of the mountain and another not too far from me to my right. About 6 a.m., the two got together and were soon having a violent argument as to who was the intruder! Loud gobbles, clucks, quavers and various other calls emitted from the next hollow as the two battled for territorial rights. I could see bits and pieces of them through my five power scope about 150 yards away. Soon the ominous chatter ceased, and they parted company. One of them was slowly working his way toward me, his mind solely occupied by the soft crooning of my husband's call. He didn't even know I was there, even though I was seated in the open, next to a fallen log. He just couldn't understand why that "lovesick" hen wasn't coming to him, so he was slowly — and I do mean slowly — working his way toward "her." From the time I first sighted the two birds until this one finally wandered into shooting range at about fifty yards, I had sat completely motionless. Nearly an hour had lapsed before he stepped from behind a tree into the path of my 100 grain 6 mm bullet. One shot felled him nicely; the reduced load entering just above the breastbone, doing minimal damage.

I had my first spring gobbler!

Turkey hunting is mostly a waiting game. But when the pay off comes, it makes up for all of the unproductive trips afield in search of the gobbler.

April 18, Tuesday

Today was to be a lazy enjoyable one for me. I quite contentedly stayed at camp, cooking and humming to myself, thinking about yesterday's events. My 13½ pound tom was all neatly packaged and in the freezer at home. His four inch beard was carefully laid aside to be later mounted on a plaque for the living room.

About 6 a.m., I glanced out the window — and there was my husband with his spring gobbler! I had been so engrossed in my own thoughts that I hadn't even heard him shoot!

He, too, was using a 6 mm, and took his gobbler at about 70 yards with one shot. His was from the same flock as mine, and the two were almost identical.

Only the third day of the season and we both had our gobblers. What a spring this had been!

Shirley Jenkins, Wildlife Artist

Interest in wildlife art keeps growing and the paintings here show why this is so.

Shirley Jenkins, a resident of Montross, prefers to stick to waterfowl as subjects for her paintings. Her watercolor renditions of these birds will make those who have seen waterfowl in flight remember the beauty of the sight.

Canada geese (left), seasonal visitors to the Old Dominion, are shown in the marshy setting native to them.

Mallards, a common sight in many parts of the Commonwealth, are a good subject for a waterfowl artist, as Ms. Jenkins illustrates here. Her mallards in flight (below and left) also detail the majesty of waterfowl. These ducks, a favorite of many, are frequently seen by observers who are always impressed with the sight.

As long as there are artists such as Shirley Jenkins, the popularity of wildlife art will maintain its upward path. May it long continue.

SNAKE-OPOLY

BY JOHN BEARD

Slither your way through our quick quiz and test your snake I.Q.

The word itself triggers a controversy of unequalled fervor. The chance sighting of one of these unobtrusive characters causes confusion not uncommon to Monday Night Football. Houdini, in all his illusions, could never equal the mysticism of the snake.

My mountain neighbors relate the folk stories that "rattlers are matin' with black snakes this year" and "snake won't die 'till sundown." Why do these usually harmless animals cause such a stir? Why is so little known about the unobtrusive, legless snake? Why the fuss?

For ages, snakes have been shoved into the dark recess of our lives. Realizing that snakes, like dark rooms, take on a different appearance when a little light is shed on them, we can begin to explore the world of the snake.

The following quiz is designed to help you light up your knowledge of snakes. The quiz, like a snake, is different. Instead of going through in numerical order, go where your answers lead you. Start with question 1 and then go to where your answer leads.

1. Can you tell if a snake is poisonous by the shape of its head?
   If your answer is yes, go to item 4.
   If your answer is no, go to item 6.

2. If you're reading this, you've either gotten lost or are jumping the gun. You don't take this quiz in numerical order.
   Return to 1 and go where the answer sends you.

3. You might think so, but its not a dependable method.
   Return to 9 and try again.

4. Sorry. That's an old wives tale!
   Please go back to 1 and choose the correct answer.

5. Right! To be exact, we have 4 — the rattlesnakes, copperheads, water moccasins and coral snakes.
   Now go to 12 and give it a try.

6. Right! A poisonous copperhead has a triangular head but so does a non-poisonous water snake. A non-poisonous king snake has a rounded head but so does the poisonous coral snake.
   Now go to 9.

7. Correct! Copperheads, rattlers, and cottonmouth moccasins have eliptical (cat-like) pupils. Coral snakes have round pupils.
   Go to 11.

8. Sorry, another organ controls smell.
   Please return to 12 and try again.

9. Can you tell if a snake is poisonous simply by the shape of its eyes?
   Yes, certainly - 3.
   No - 7

10. Oops! Another old wives tale.
    Try it again!!

11. How many kinds (not species) of poisonous snakes do we have in the United States?
    More than 5 (go to 13).
    Less than 5 (go to 5).

12. The term "pit-viper", given to rattlers, copperheads, and water moccasins, means that these snakes have a small pit between their eyes and nose. This pit is actually a:
    Heat sensing organ (go to 17).
    Smelling organ (go to 8).

13. Relax! We don't have that many poisonous snakes.
    Please return to 11 and try again.

14. Snakes use their tongue to:
    Bite their victims (go to 18).
    Smell (go to 20).

15. As long as a snake is underwater, you have nothing to fear. Snakes can't bite underwater.
    False (go to 21).
    True (go to 10).

16. When you're in rattlesnake country, you're relatively safe if you listen for rattles because a rattlesnake always rattles before striking!
    Right! (go to 23).
    Dead Wrong! (go to 19).

17. Well done! The little pit can pick up heat at 18 inches or less. Any warm blooded animal (man included) which passes within 18 inches of these pits stands a good chance of being bitten if the snake is hungry.
    Now try 14.

18. Sorry. A snake's tongue is soft, like yours and mine.
Try 14 again.

19. Bingo! In a recent survey of 84 rattlesnake victims, not one could recall hearing a rattle before he was bitten.
Now try 25.

20. Correct. The snakes pick a bit of air and feed it to a specialized organ which tells them what is near, what smells are around, etc.
Go to 16 and try.

21. False is correct! Snakes can bite underwater!
Now go to 34.

22. Sorry. Although the copperhead is responsible for more bites than any other venomous snake, there is not one recorded instance of a human death from a copperhead bite.
Return to 25 and try again!

23. Ouch! That idea could cost you a lot of trouble.
Try 16 again.

24. Correct! Owls, hawks, skunks, raccoons, and even other snakes eat snakes regularly.
Go to 39.

25. The copperhead is the most deadly of all snakes!
Agree (go to 22).
Disagree (go to 28).

26. How many people die annually in the United States as a result of snake bites?
Under 15 (go to 33).
Over 15 (go to 31).

27. Right! If bitten by a poisonous snake, it is better to tie a constricting band above the bite, pack the area in ice, cold compresses, etc. and to get to a hospital as soon as possible.
Now try 41.

28. Well done! The most deadly of all snakes in the United States is the Diamond Back Rattler (although the venom of the coral snake is drop by drop the most deadly).
Now try 26.

29. Not unless you have two broken legs!
Run back and try 34 again.

30. Do snakes have any natural enemies (besides man)?
Yes (go to 24).
No (go to 35).

31. You've been watching too many movies!
Return to 26 to try again!

32. No, there really is nothing more to it!
Try 41 again.

33. Correct. More people die annually of bee stings than from snakebites in this country.
Now try 15.

34. If you wanted to get away from snakes, it would do no good to run as snakes will chase you and out-run you.
Absolutely! (go to 29).
Hogwash! (go to 37).

35. Yes, they do!
Go back to 30 and pick the other answer.

36. Snake poison (venom) can do no good, therefore, every poisonous snake should be killed.
Absolutely (go to 40).
Never (go go 43).

37. Correct. Snakes, like any wild animal, run from man. In addition, the fastest any snake in the United States can crawl is about 3½ miles per hour!!
Now try 30.

38. Correct. Any non-poisonous bite can be treated like an ordinary cut.
Now give 36 a whirl.

39. If you get bitten by a poisonous snake, it is best to tie a tourniquet above the bite, cut two xx's over the holes and suck out the poison.
Of course! (go to 42).
Definitely not! (go to 27).

40. Absolutely not!
Try 36 again.

41. If bitten by a non-poisonous snake, it is best to wash the bite with soap and water and treat like an ordinary cut.
No, there's more to it than that. (go to 32).
Yes, that's all that is needed. (go to 38).

42. Bad news! There's a better way!
Try 39 again.

43. Snake venoms are being used to destroy blood clots in the brain, to clot blood in hemophiliacs (bleeders), to experimentally control cancer, to treat colds, and for many other medical purposes.

It Appears To Me

By Curly

. . . A PERSON OUGHT TO HAVE ONE

Now that the ice is gone from even the most remote rivers and creeks and the debris generated by floods and such is beached or gone, it is time to think about canoeing again. Along that line, the folks at the Tennessee Valley Authority have published a brochure especially for all you canoe enthusiasts and it is free. The brochure lists thirty-two commercial river outfitters in the TVA region and, in addition, shows the rivers that they serve and the kind of service each outfitter offers. That's not all. . . it also contains phone numbers that can be called to receive daily updated reports on river flow. Another part contains a map of the major streams in the Tennessee Valley and still another features water safety rules for river recreation. Ask for the Canoeists Brochure by writing TVA's office of Natural Resources, Norris, Tennessee 37828.

I reckon that we are all familiar with the ongoing competition between breakfast cereal manufacturers as each one claims that theirs is "crunchier" than the other. Well, sir and madame, on the subject of crunch we are all in one, with this energy situation. Regarding that problem, the American Petroleum Institute has come up with a booklet which encourages motorists not to throw away their engine oil but to recycle the liquid instead. Seems as though they calculated that the motorists who change their own oil do so at the rate of about 190 million gallons each year. . . and throw it away needlessly. Not only is it a terrible waste but the practice certainly has pollution potential to say the least. If you are a "do-it-yourself drainer" or know of someone that is, write for your free (single) copy of "Recycle Used Motor Oil" from the American Petroleum Institute, Dept. C, 2101 L St., N.W., Washington D.C. 20037.

In a similar vein, the National Wildlife Federation has published a report entitled "Energy--A Growing National Problem." The report, sixteen pages in length, emphasizes the fact that we must find new sources of energy while developing new and more efficient ways to use what is remaining of the current energy supply. Request a free copy from: Educational Services, National Wildlife Federation, 1412 16th St. N.W., Washington D. C. 20036. Although single copies are free, additional copies may be purchased for $.20 each.

. . . FOR YOUR BOOK SHELF

True, it's May and every living plant is "bustin' out" and your thoughts are far from winter. As a matter of fact, you probably just want to forget the winter of '79. Howsomever, it might not hurt to heed the sage advice offered by John Vivian in his booklet entitled "How To Select, Cut and Season Good Firewood". . . and you can do so for just one buck ($1.00). Crammed into the 28 pages of this gem are details and advice ranging from where to find free wood, selecting it when you locate a source, getting the most out of the wood you select, how to stack and season and how to select the right chain saw for your personal use.

Just a sample of the text gives you an idea of the thought and knowledge which has gone into the preparation of this book, "Selecting Good Wood. . . Any tree will burn, but in general the more dense and heavy it is once air-dried, the more the sun energy the wood contains. A chunk of hickory that tops 60 pounds per cubic foot will more than outlast two armloads of elm or pine, which weigh less than half as much. . ."

The book is availabe from the Customer Service Department, Stihl Incorporated, P.O. Box 5514, Virginia Beach, Virginia 23455.

Earlier we were talking about recycling oil, as you may recall. Well, it is quite evident that oil is just one of the resources that needs re-examination in that regard. The list could and probably should be endless if we are to pull ourselves out of the mess that we have made. Just one of the many resources available is glass in the millions of bottles used and thrown away each day. Now for the pittance price of $.25 (two bits) you can get a publication which will open your eyes to the potentials in your pantry or on your porch. "How To Make Useful Articles For The Home From Glass Bottles" is available from Hobby Book, Department BB, Box 990, 608 E. Baltimore Pike, Media, Pa. 19063.

One more item on energy . . . this one is a paperback entitled "Money-Saving Guide to Energy in the Home." Published by Doubleday, this 102 pager is part of the Consumer Reports series by that publisher. Chock full of good illustrations and valuable information about the do's as well as the don'ts in selecting a heating system, weatherizing and a wide variety of other details pertaining to the care and feeding of one of the most expensive members of your family. . . your home. It is available from Doubleday & Co. Inc., 245 Park Avenue, New York, N.Y. 10017 at the cost of $3.50.

. . . AND THEN

"Is the world running out of humour the way it is said to be running out of oil? It sometimes looks that way as we watch those so-called "comedies" on television. But not really. . . the best jokes are the ones that spring from our daily existence." The Royal Bank of Canada Monthly Letter.

Growing Up Outdoors

BY SANDY COLEMAN

Sunfish Fishing

The beautiful May morning sunshine made Matt and Amy skip a little as they left their house and felt the warm spring morning.

"I can't wait to get to the pond," Amy told her older brother as they gathered up their fishing poles in preparation for the short walk that would take them to the banks of the small pond. "Do you think we'll catch any fish?" she asked.

"Sure we will," Matt said confidently. "The sunfish are right along the banks in the shallow water this time of year. We can catch them for sure." The brother and sister began their journey.

"Why are they along the banks?" Amy asked.

"Well, they're nesting this time of year. When we get to the pond you will see small depressions in the clay and gravel. That is where the sunfish lay their eggs. The fathers guard the nests until the eggs hatch. That's why they're along the banks now. We should be able to see them since the water is so shallow."

When the two arrived at the pond, Matt warned Amy to be as quiet as possible. "There's no point in upsetting the fish. We shouldn't let them know by our talking that we are here." Amy nodded agreement and the two set down their poles and lures. They were using very light rods suitable both for the fish and the size of the children!

Amy walked quietly along the banks of the pond looking for the depressions that Matt had told her she would find. There they were! The nests looked to be about 20 inches wide and about six inches deep. There were several that Amy could see, but they were spread far apart. They didn't appear to be any closer to each other than 20 feet and the water looked to be about 12 inches deep — deep enough so that Matt and Amy were able to observe the colorful fish daring about.

About an hour later, Matt and Amy looked at the eight fish they had caught.

Illustration by Diane Grant

"I didn't think we'd catch this many," Amy said excitedly. "Why don't we stop now and eat our lunch, then we can see if we can catch some more fish." Matt took the sandwiches out of the backpack he had carried down to the pond and soon the two were munching on the ham and cheese and sipping iced lemonade that their mother had packed for them. The two felt like real adventurers.

"Matt, you call them sunfish, but what kind of fish are they really?" Amy said as she took a sip of lemonade.

"Well, the fish that we caught are bluegill. But the sunfish family includes pumpkinseed, rock bass, redbreast sunfish and largemouth bass," Matt explained. "In a small pond like this one we would really only be very likely to catch bluegill and redbreast sunfish."

"Oh, I thought there just might be one sunfish. But I see now that they are a whole family." Amy said as she began to prepare to place her line in the water again.

An hour later found the two with four more fish. "Twelve fish," Amy said happily. Even Matt looked excited at the fish they had managed to outwit on that spring day. "We can eat these for dinner, right, Matt?"

"Sure we can. But first we have to clean them. Mom says that whoever catches a fish has to clean him."

Amy nodded agreeably and sometime later found the two with the cleaned fish ready to give to their mother for their evening meal.

"I like fishing," Amy said. "When you catch so many fish it isn't even boring, it's really exciting even."

"Yes, but you don't really catch that many fish all the time. Sometimes you can sit for hours without getting a strike," Matt said.

"Well, then, why bother?" Amy asked.

Matt just smiled. "Someday you'll understand," he said confidently.

Birdwatcher Watching

Is it an obsession or just a finely-tuned awareness of the natural world? What makes an ornithologist?

by Lisa N. Stauffer

"Pshshsh, pshshsh, pshshsh," went the man at my elbow. A few paces behind, someone answered, smacking his lips loudly on the back of his hand. Startled, I jumped as a third member began a long, loud "hoooooo" that echoed through the trees.

Lunatics? Perhaps — but the amazing answers to their insane conversations included the heart-lifting trill of the winter wren, the high-pitched song of the golden-crowned kinglet, and the characteristic "per-wee?" of the yellow-bellied flycatcher.

It was the Virginia Society of Ornithologists (VSO) coupled with my ornithology class from Virginia Tech that had gathered at the trail head to Mount Rogers in search of high mountain birds. Tony Decker, a renowned expert on high mountain birds, was to be our guide.

Mount Rogers, located in southwest Virginia near Marion, is the highest mountain in the state, with an elevation of 5729 feet. It is also a national recreation area, boasting not only the scenic beauty of the Appalachians, but also several comfortable campgrounds — and, for the more rugged individual, a section of the Appalachian trail.

Mount Rogers' elevation accounts for its unique habitat and bird-life. Atop the mountain, one finds vegetation characteristic of more northerly climates and this vegetation attracts birds that are unusual in Virginia. For example, the yellow-bellied flycatcher, a bird that breeds nowhere else in Virginia, has been found nesting near the top of Mount Rogers.

The challenge of finding this small bird spurred many of our group's veteran birders upward. Being a novice to birding, however, and a skeptic as well, I doubted that even the most expert of them could find this elusive creature in all the woods atop Rogers.

The climb began. I chuckled to myself as I noticed the older members of our group lagging behind. Did they really hope to walk the entire six-mile round trip with the most youthful of us?

There were three personalities among them that I found most amusing. The first, a plump white-haired woman with a perpetual smile; the second, a thin woman with a myriad of wrinkles, and the third, a woman dressed in knee-length shorts, a cotton shirt, knee socks, and hiking boots, whose age was evident in her tired-looking legs.

As I was musing to myself over these women's peculiarities, the entire group came to a halt, and 25 binoculars were raised. A novice to birding, I fumbled rather foolishly with mine, focusing in too late to see the bird. A vesper sparrow, someone informed me, common in open meadows and fields.

This field was certainly a beautiful one. Surrounded by the distant blue of the surrounding mountains, it reminded me of a scene from "The Sound of Music." But now we were approaching the woods.

Once among the trees, we began to hear various invisible birds singing in the branches. As the group again came to a halt, I heard a "pshshsh, pshshsh, pshshsh" from the front. In the midst of my unbelieving chuckle, a bird's answering whistle was heard. Another "pshshsh, pshshsh, pshshsh," and we saw the bird fly to a closer branch, again with an answering whistle. Amazed at the bird's curiosity and quick response, I stood with mouth agape as the more experienced birders identified this gray bird with white speckles as the solitary vireo.

This same phenomenon occurred time after time as we progressed up the trail. We would stop, listen to the various bird calls, then someone would make the "pshshsh, pshshsh" sound, and a bird would appear. Using this method or the alternative of loudly "kissing" the back of the hand, we brought juncos, towhees, the yellow-crowned kinglet, the Canada warbler, and various other birds into view.

But the most sought-after bird, the yellow-bellied flycatcher, was yet to be seen.

We proceeded upward. The change in vegetation with the increase in altitude was marked. The lower forest, comprised mainly of mixed deciduous trees, now became spruce and fir. Lovely ferns replaced the shrubby underbrush in the lower elevations, and various higher altitude wildflowers added to the beauty. The air seemed fresher and cooler. I noticed that the elderly woman's perpetual smile became even broader as we climbed.

Eventually, we came to a bench and scenic overlook. Unfortunately, fog prevented us from seeing what was supposed to be a spectacular view of White Top, the mountain that Tony Decker and the rest of the original group were to climb. At this point, I noticed that while several middle-aged members of our group and one older woman with a cane headed immediately for the bench, the three women that had amused me earlier

A red-eyed vireo was seen by the intrepid birdwatchers during their climb up Mount Rogers. (below) The mountain boasts something unique in this area, high elevation fir stands. The top of Mount Rogers is the highest point in Virginia. (right)

Photo by Jerry Via

were carefully listening to the bird sounds of the woods. Suddenly, they broke into an ecstatic chorus, "Did you hear it? Did you hear it? A winter wren!" Grinning broadly, they joined together, listening ecstatically.

I found myself beginning to listen, too. All at once, I was aware that what I originally discredited as an eccentric obsession with birds was really a well-developed awareness of the natural environment. Listening now, the song of the winter wren was the sweet music of an old friend to their ears, but a foreign melody to my own. I found myself beginning to appreciate their "obsession."

We began the last leg of our journey. I watched with growing admiration as the thin woman took the lead. She walked lightly along the path with increasing delight, stopping now and then to listen to a bird singing in the distance.

After flushing out a few towhees and solitary vireos with the "pshshsh, pshshsh" and "kissing," a few members of the group fell behind, trying to call the now-distant winter wren. The three women fell behind, also. If they hadn't, I am convinced that they would have been the first to the top!

As it was, those of us who tired of calling for the wren headed for the top. A long, loud "hoooooooo" stopped us dead in our tracks.

"That's just someone imitating a screech owl to try to get the smaller birds to mob it," a veteran explained. "The smaller birds will band together to try to drive the owl out, since it often preys on them."

Finally, we reached the top. Unfortunately, the fog had not yet lifted, so the view was minimal. But the sign reading, "highest point in Virginia — 5729 feet," the freshness of the air, and the lunch we had carried up seemed reward enough.

When the rest of the group had arrived and seated themselves on various rocks for lunch, a youngish woman came walking up, excitedly.

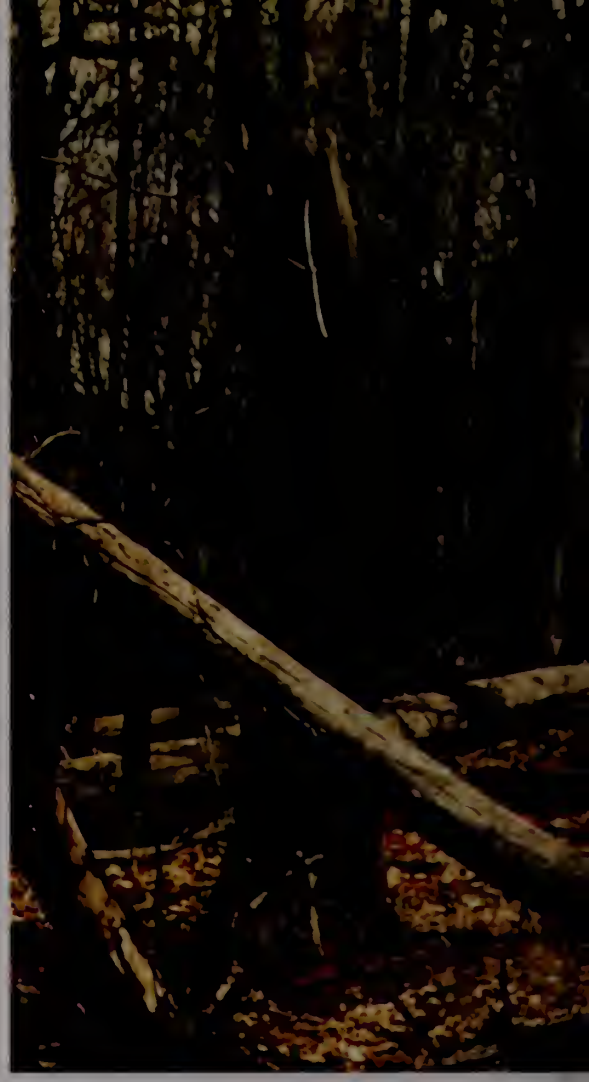
"We've found the yellow-bellied flycatcher," she said proudly. "Come on, I'll show you where it is."

No longer amazed, I smiled as the group headed excitedly down the trail. The elusive little flycatcher didn't stand a chance.

The Challenge of the American Chestnut

BY JUDY PRICE

Almost gone, but far from forgotten, the fight goes on to preserve the chestnut.



Remnants of blight-killed chestnuts are still found in the southern Appalachians.

The American chestnut is history, a dynasty passed. It is the victim of a fungus more persistent than the potato murrain of Ireland, more thorough in its destruction than wildfire. And yet, orange-dappled and girthed, the chestnut endures.

Some say that the chestnut is through, destined to remain ever after as shrubby undergrowth, or not to remain at all. They say that the chances of finding a blight-resistant mutant are astronomical, not a million to one, not that good. Others say there is hope, that there is always hope; perhaps tomorrow. And still others say only words to revive the memories.

Chestnuts once sold for seven dollars a bushel. It was a fair price for the vendor and for the buyer; firm savory meats, much like (but more ambrosial, say the ones who remember) the Chinese chestnut fruit. The yield was plentiful, and it was certain, fluctuating less from year to year, than the mast of the trees (primarily oaks which produce a bumper crop every three or four years) that have replaced it.

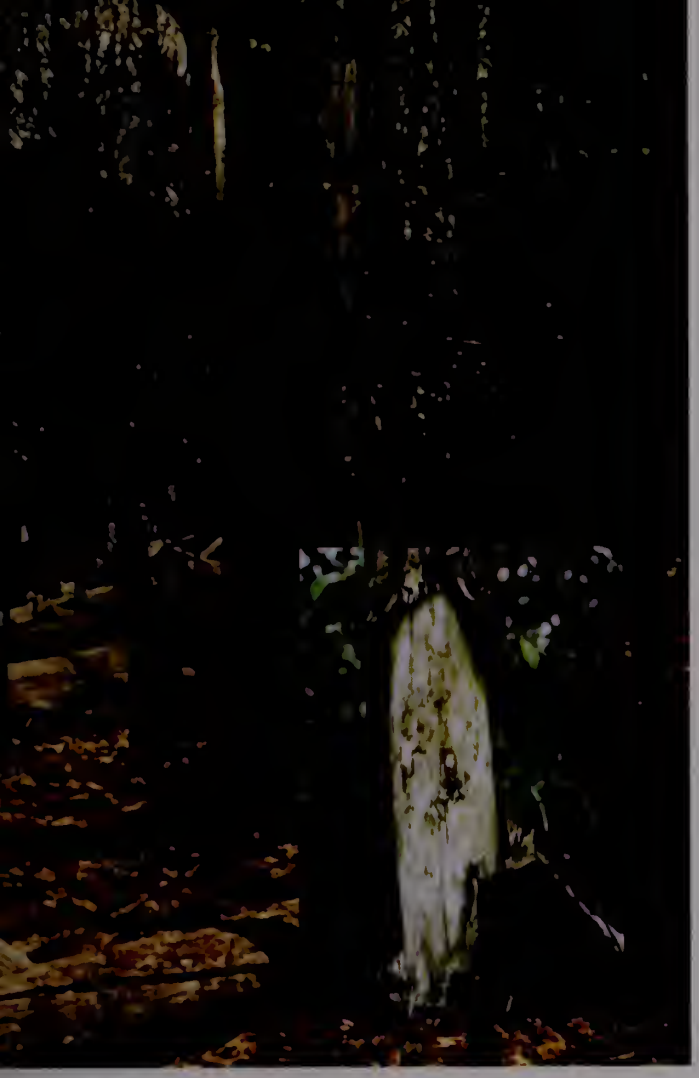
To the birds and animals who foraged for the fruit of it, who inhabited the dry ridges that it dominated, the chestnut was a valuable tree. For the Appalachian people, who lived with it, who lived by it, it was a mainstay, a security; bushels of nuts to roast, to fatten the hogs, to trade and sell. It was a thread of life.

Though coarse-grained, the wood was sturdy and lasting. Homes were built of it, from frame to the shakes on the roof. Cradles were sometimes constructed of chestnut wood. Coffins were chestnut, too. Commercially it became utility poles, railroad ties, anything that required strength and durability. It was rich in tannin, not only the bark, but the wood as well. Supplying nearly half of the vegetable tannin used in the United States, the chestnut was the sole support of some tanneries. And in the Carolina mountains, it afforded a small industry for the people, that of felling and chipping trees.

The experts say that every fourth tree in the Appalachians was a chestnut. It was luxuriant on the mountain ridges, creating strong climactic forests that seemed invincible, that seemed inexhaustible.

It was a fungus, *Endothia parasitica*, that exposed the limits of the chestnut. The fungus was an alien, of Orient origin, accidentally introduced into this country on nursery stock in the 1890's.

It was a decade later, the summer of 1904, when the blight was discovered. Herman Merkel, chief of New York City's Zoological Park, found the fruits and effects of it on a number of chestnut trees. He discovered and treated it, but like the experts who studied it for years after, he did not recognize it. He knew it to be a fungus. The Department of Agriculture



The disease (inset) girdles the tree, cutting off the life-flowing juices.

knew it as *Endothia*. But the exact species, its origin and nature, was a mystery.

It was nearly another decade before the fungus was clearly identified as *Endothia parasitica*, the decade in which it swept the northern states and invaded Virginia and West Virginia. It was this decade, too, that the possible extent of the destruction was realized.

In 1921 Congress appropriated $5000 for chestnut research. The next year the amount was $80,000. In 1913, Pennsylvania, making the grand gesture, allowed $240,000 for the chestnut and appointed a commission, called *The Commission for the Investigation and Control of the Chestnut-Tree Blight Disease in Pennsylvania.* After various other attempts and failures to stop the spread of the fungus, the Commission proposed a sanitary zone. Across the state, border to border, all chestnut trees in a ten-mile wide area were to be cut. But that, and all other efforts, were futile. The belt was crossed almost before it was begun.

Endothia parasitica is very efficient. Reproduced by spores, it had developed two types, one windborne, the other with an adhesive substance, carried by birds and animals. Once the spore was set, the fungus sprouted, the mycelium grew into and around the bark of the tree, girdling it, restricting the natural fluid flows. Unlike the Asian varieties, the American chestnut had evolved no resistances and the blight ravaged.

Within half a century of its entry into this country, *Endothia parasitica* had swept the natural range of the American chestnut and beyond. The once flourishing Appalachian forests were now forests of standing deadwood, or not forest at all.

Harvesting was begun in the twenties when it was agreed that there was little chance, or none, that an effective treatment could be discovered in time. Chestnuts, dead, infected, and ones still thriving, were cut for the wood, the tannin (the diseased trees were said to have a higher tannin yield), and to speed the natural processes of reforestation. Oaks began to grow up between the stumps and the hollow corpses.

No longer in dominance, no longer even secure, still the American chestnut survives. Some solitary relics of the past stand, infected but alive. These trees, because of their apparent strength against the blight, inspire optimism, a belief that through natural selection, given man's aid in the processes of cross-pollination, a resistant mutant could develop. The sprouts survive, sometimes four or five rising from a central point, from the tenacious rootstock of a chestnut fallen decades ago. These are chestnuts in abundance, the deciduous shrubs that underscore Appalachia's oak forests. They are all that remain to justify the names printed across the map: Chestnut Spring Trail, Chestnut Ridge, Chestnut Lick Hollow. And in another way, the chestnut survives, not as a token of a vanishing species, but as thriving, young trees, as hundreds, thousands of trees, growing, flowering, shedding seed.

Since the invasion of the *Endothia* fungus, researchers have been experimenting with the chestnut, trying to develop a resistant mutant of the American species. In 1927, the Department of Agriculture sent a man to the Orient to collect Asiatic chestnut seed. The bushels of nuts he supplied were rooted and distributed throughout the eastern states for research. These seedlings and thousands more — crossbred, grafted, or irradiated, have become the plantings of the researchers, the test plots of Connecticut, Virginia, Maryland, Tennessee, where, like the chestnut, the hope survives.

Still the goals have not been reached. The end, which seems always visible on the horizon, sometimes acquiring form, losing it again, is yet distant. The hybrids, those innumerable hybrids that have been crossed and backcrossed, are a large part of the test plots, but they are not the answer to America's vanishing chestnut. Many are yet hopeful; the Sleeping Giant, Skioka. They are blight-resistant, or a good timber source, or they bear good fruit. But none have met all three of these requirements, and none is the forest tree that the American chestnut was.

Grafting, scions of American chestnuts on the stock of Asiatic varieties, has been attempted, and sometimes with success. Rooting has been attempted. Cuttings are taken from American chestnuts, especially those trees that seem most resistant to the blight, and various methods used to root them. But these processes, grafting and rooting, are arduous, time-consuming, and often failures.

The work with fungicides has progressed since that first treatment in the New York City's Zoological Park.

The wood of the chestnut was used often in building. This cabin was built in the 1930's with blight-killed chestnut logs. The loss of the chestnut severely affected the furniture and building industries.

Spraying, injecting the trees with chemicals, or applying the concoctions directly to the wound has been tried. And there has been success, for the scientist in the laboratory and sometimes for the individual researcher working alone with shoe polish or turpentine, in the basement or garage. But in this vein, even complete triumph over the blight will not return the chestnut to the forest. Each tree would require treatment, each seedling, each new generation. The fungicide would allow a healthy tree, but it would not produce a resistant strain of the chestnut.

This is the object of irradiation, resistant chestnut, a mutant that will transmit the resistance, in whatever element it is held, to its offspring. Thousands of seeds have been irradiated, the first ones in 1956. They have been rooted, planted, and observed, observed for years. The process is slow, requiring decades and generations of trees to find success, if there is success. Intercrosses between the mutants are made to advance the process, but still there is much waiting to be done before any results can be defined.

The work continues. New, perhaps better, more hopeful, methods are being tried. Research is now being made with a hypo-virulent strain of *Endothia parasitica.* It was discovered in Europe, growing wild with the blight fungus. Scientists there found that when the two strains were grown together, the blight fungus became less toxic, like the other, and so not as deadly to the tree. American research with the imported strain of *Endothia* began in Connecticut in 1972. At first, growth of cankers in American chestnuts was not arrested, but after experimentation, a hypo-virulent strain was isolated that was effective in inactivating the American blight fungus. Test plots were established, and renewed hope.

The solution seems simple, only a matter of spreading the hypo-virulent fungus on the infected trees and watching the recovery, the re-establishment of the American chestnut. But few things in nature, if any, are so simple. The work is in its initial stages, and though the results have been encouraging, there is still the waiting, and the difficulties, and some uncertainty.

If there is success, even if the new fungus is capable of entirely neutralizing the effect of the American chestnut fungus, it is not yet known what will become of it when it has completed its work. There is no certainty that it will remain in the wild to combat the blight fungus, which, because it is saprophytic on oak wood as well as parasitic on chestnut, will certainly remain. It is not known whether this new approach is workable as a method of reviving, of reconstructing, the chestnut forest, or whether it would be useful for saving only individual trees or test plots of trees.

Writings about the American chestnut are now writings about *Endothia parasitica.* The tree endures, the fungus endures. They are one. The chestnut may never again be free of the parasite, but it may, or men may aid it to develop a strength against it. And the American chestnut, that has for so long been lost to legend and the laboratory, may again be found, wild and healthful in the forest — flowering, fruiting, forming fertile seed. It may once again be celebrated on the ridges of the Appalachian Mountains as it is in rhyme, as it is in memory.

Outdoor Notebook

Chincoteague Bird Count

The 1978 Chincoteague Christmas Bird Count results have been tallied with 162 species being identified. This total was seven better than last year's count but still below the record of 172 set in 1975. The count was held on December 28, 1978 with 53 participants covering the town of Chincoteague and the Chincoteague National Wildlife Refuge. There were approximately 84,661 individual birds sighted during the count. The species having the greatest number of individuals was the Snow Goose, with 19,500. Two endangered species, the Southern Bald Eagle and the Peregrine Falcon, were also observed during the count. Unusual sightings included an American Flamingo (which had been on the refuge since October), a Whimbrel, an Ovenbird, a Black-and-White Warbler, a Dickcissel, two Yellow-breasted Chats and a Lincoln's Sparrow. Most of the waterfowl numbers were low but this can be attributed to the freezing of refuge impoundments the week prior to the count.

The Christmas Bird Count is used by the refuge as an index of avian species and population numbers in the Chincoteague area. Some species which had declined due to the previous harsh winters have increased in significant numbers. These species include Golden-Crowned Kinglets (156 total 1978 vs. 54 total 1977 count); Killdeer (205 total 1978 vs. 64 total 1977); and Carolina Wrens (151 total 1978 vs. 80 total 1977). Other species such as the American Oystercatcher (193 total 1978 vs. 603 total 1977 count) and the Dunlin (4,497 total 1978 vs. 13,168 total 1977) declined. Sharp increases or decreases over previous years' counts could indicate possible changes in habitat.

SHUMATE PRINT AVAILABLE

The art of George Shumate that appeared in our February issue attracted much favorable comment from our readers. So, we thought you might like to know that a print is available of Shumate's snowy owl. A signed, numbered print is available for $35 and a signed, numbered and remarqued print is priced at $75. The print is in beautiful color and is a limited edition of 500. It is sure to grow in value with the years and is an addition wildlife art collectors will welcome in their homes and offices.

Inquiries concerning the print should be directed to the artist himself at 4522 Kirkwood Drive, S.W., Roanoke, Virginia, 24018.

PROTECT THAT MAP!

How many times have you taken maps on vacation only to have them wear out before you reached home? Or perhaps you have consulted a rain-soaked map while hiking or hunting and found most of the information on it smeared. Even at home, a map is in danger of being lost or damaged in overfilled drawers and on closet shelves. A map's value can increase through the years, especially if personal information is recorded on them like good places to camp, picnic, or locate collectibles. Well, here are some techniques to lengthen the life of your map by increasing its durability.

Folding destroys maps. It weakens the paper, and tearing along the creases is the result. Tearing can be prevented by mounting the map on cloth. Cloth strengthens the map and takes up the strain at the creases. (How many pair of trousers have you seen rip along the creases?) Bleached muslin or other fabric free of starch filler (old bed sheets or pillow cases work nicely) are suitable materials. The map is mounted with flour or wallpaper paste.

Although the process of mounting a map is rather simple, you may want to practice before-hand with an old map and scrap cloth. First determine how you want the map folded. Do this without actually creasing the map. Folding can take many shapes. Pocket-size and tackle box-size are popular. Check the size of your map pocket on your back-pack. Canoeists may wish to develop a "strip map" showing just the river and land immediately adjacent. Several adjoining maps may be mounted together. You may wish to decrease the map size by cutting any unnecessary margins off the map.

Next, draw the fold lines on the back of the map in pencil. Number each map section lightly in pencil (so you remember how to fit them together). Cut a piece of cloth backing slightly larger than the overall size of the map. Stretch the cloth on a board, and hold it in place with tacks spaced 3 to 4 inches apart.

Working with one piece at a time, apply a smooth flour and water paste or wallpaper paste with a medium-sized paint brush to the area on the cloth where the map piece is to be placed. Use plenty of paste so that the edges of each map section will all be firmly attached. If the paste is lumpy, strain it through cheese cloth or a fine screen.

Dip the map piece in water for about as long as you would a slice of bread in egg batter when making french toast (2-3 seconds). Individual map sections should be spaced about 1/8 inch apart. Gently dry the sections with a paper towel, working outward from the center of each to eliminate wrinkles.

If you would prefer to roll your map (or nautical charts), it still should be mounted. The procedure is the same except that instead of cutting the map in sections and floating the map in water, apply a coat of paste to the back of the whole map. Wait several minutes until the map becomes soft. Apply a second coat and place the map on the cloth. Smooth out wrinkles as described above. For both types of map mounting allow at least 24 hours to dry. Once dry, remove the map from the board and trim the cloth to the map edge to prevent fraying. A single-edged razor blade is excellent for this purpose.

The finished product can be folded or rolled and inserted in a cardboard tube. Tubes of various sizes can usually be obtained in art supply stores. A more economical way to find tubes is to save them from wax paper, aluminum foil, plastic wrap, wallpaper, and gift wrap. The tubes can be sealed at the ends with masking tape, or plastic wrap and rubber bands, to prevent dirt and moisture from entering.

One of my favorite "keep dry" methods is to place the mounted and folded maps in a clear plastic pencil case available at most stores carrying school supplies. They come in a variety of sizes. Be sure to get one with a plastic zipper (metal ones rust). Because the map is mounted, it can be folded backward or forward. This means that you can fold your map so that the portion you wish to look at is visible through the case. Neither wet hands nor wet weather can harm the map. Pencil cases can be easily packed or stuck in your pocket. They are also conveniently stored in ring binders. If the back of each map section is labeled with the map's name, the folded map can be identified at a glance.

A trick I have used when canoeing or fishing is to put the map in a potato chip can (those with the plastic tops). These cans have several advantages. They are light weight, and water tight. But better yet, if they accidentally take a swim, they will float (even if your canoe does not), and can be spotted easily because they are brightly colored.

—Mark R. Phillips

TWO NEW BOAT RAMPS OPEN

Jim Engle, Jr., Chief of the Lands and Engineering Division for the Commission of Game and Inland Fisheries has announced the opening of two new boat ramps in Halifax County on the Staunton River. The new boat ramps, Clover and Watkins Bridge, are located off Routes 360 and 746 respectively and will provide much needed public access for the striped bass fishermen and canoeist alike.

The projects were a cooperative effort between the Commission of Outdoor Recreation, which helped provide part of the funding, and the U.S. Army Corps of Engineers, who made available the land needed for construction of the road, ramp and parking area at Clover.

Help for the Lost

Those of us ready to take on the woodlands during this beautiful time of year often don't prepare quite the way we should. With that in mind, the Game Commission is offering for the adventurous maps to both the George Washington and Jefferson National Forests.

Jefferson National Forest maps are available at the cost of $1.00 for each individual map. The five districts represented are the New Castle, Clinch, Wythe, Glenwood and Blacksburg.

George Washington maps are $.50 individually for the six districts: Lee, Pedlar, Warm Springs, James River, Dry River and Deerfield. Checks should be made payable to the Treasurer of Virginia.

Why not prepare in advance for your next trip? Thinking ahead just might save you some unnecessary adventures.

A RARE DELICACY

Chesapeake Bay cobia fishermen often find their chum slicks attracting small sharks. Most fishermen consider sharks no more than a nuisance and don't keep them to eat.

Shark, however, is a very tasty morsel of seafood. If it is to be cooked, though, it is most important to prepare it properly. Immediately upon landing a shark it should be cleaned, cut into steaks, which are then skinned, and put on ice. If the meat can't be used within twenty-four hours it must be frozen or smoked.

Although sharks are notorious for their diets most are not man-eaters at all. They eat, instead, a variety of small fish, crabs, and stingrays. The meat, itself, is very clean and white. A shark steak is an attractive piece of meat, easy to eat because it has only one piece of cartilege, and easy to cook, as well.

Shark can be fried, boiled, chowdered, or broiled. No matter how you cook it, remember that shark is a very bland fish and benefits from heavy seasoning or rich sauces.

Our favorite shark recipe calls for broiling. Plan on two, one and a half inch steaks per person. Place each steak on a thin slice of Virginia ham. Slice one or two small onions over about eight steaks. Salt and pepper well. Broil the steaks about ten minutes on each side, or until the meat looks flaky and lightly browned. Add a can of whole potatoes, a can of mushrooms and a can of undiluted cheddar cheese soup. Bake at 325° until the potatoes and soup are hot.

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Through the Looking Glass

The windscreen on your boat is not just for style, but is a vital protector of your vision. In smooth seas when the boat hits top speed, the windshield protects your face from stinging water drops and insects. In heavy going, a good windshield and wiper provide visibility which is important to piloting and traffic avoidance.

To clear your view there are four basic choices: hand-operated wiper blades, electric wipers, the rotary insert which is seen commonly on commercial boats and on some pleasure boats, and a new coating which makes water bead up rather than streak.

Hand wipers are easy to install and are trouble-free in operation. They make a cheap and simple choice for the casual day boater who doesn't intend to do a lot of boating in the rain. Rotary types are rugged and effective, but provide only a small vision "hole." Use this type only if your helm is close to the glass. That brings us to electric wipers.

According to Steve Sparling at American Foreign Industries in San Francisco, a supplier of electric wipers: "We make three types. We have a standard wiper which is non-waterproof but which can be used in a dry cabin which has no humidity problem. We have a 100% waterproof wiper, and a heavy duty, 15-amp non-waterproof model which has an extra heavy gear train."

The choice of the right wiper is important both to the effectiveness of the wiper itself and to protect your costly windshield. You'll have a choice of frame-mount or deck mount, waterproof versus non-waterproof (it is generally better to get waterproof wipers), 11" or 14" arms which come either straight or curved, and a choice of extra-long shafts which you will need if your glass or deck are extra thick.

In installing wipers, adjust the arm tight to keep the blade against the glass even at the wiper's highest speed, but without excess pressure. On a curved windshield, the motor shaft should be aligned so excessive load is not put on the arm as it comes around the curve. And the wiper motor shaft should always be 90 degrees to the glass.

Sparling's recommendations include: follow installation instructions precisely. Good wiring, done according to instructions which come with the kit, is essential. "The small bolt hole in the end of our water plate must be used to prevent the motor from rotating on its shaft and ruining the motor," Sparling warns.

"For a dual installation where a single switch is preferred, order one double-pole, double-throw switch without a center "off" position," Sparling went on. "And for safety, install a 10-amp fuse between the battery and the switch."

Once installed, never use wipers on dry glass. If the boat is left sitting in the sun, remove the blades or cover them because heat hardens the rubber and makes it scratchy. Keep blades fresh and clean and, at the first sign of squeaking or grinding, renew the grease in the gearbox.

Wipers, in a number of circumstances, are a necessity to commonsense boating safety.—*Gordon Groene*

In Nature's Garden

Sassafras

BY ELIZABETH MURRAY

Every other year we hold an open house at the Mountain Lake Biological Station in southwest Virginia. In the main laboratory there are exhibits of class work, displays of local plants and animals and demonstrations of current research projects. At the other end of the lawn in the station dining-room, refreshments are served, cookies, lemonade — and sassafras tea. I know that some members of the general public return time after time, primarily for the sassafras tea. I am not penitent about sacrificing a few sassafras saplings to make the tea. Sassafras is flourishing and plentiful throughout our Virginia woods. The family to which it belongs, however, the *Lauraceae* or laurel family, is primarily a tropical family and only sparsely represented here and in other temperate zones.

Economically, the family is important for the aromatic oils that are responsible for the fragrance of many of its members. Cinnamon and camphor both belong in this family, as does the avocado. Sweet bay, *Laurus nobilis*, is the well-known bay tree of Europe whose leaves have been used as a spice and in fragrant pot-pourris for hundreds of years. In the U.S. we can use leaves of the red bay, *Persea borbonia*, which grows sporadically in coastal areas throughout the southeastern states. Also around here in the same family, we have the spice bush, *Lindera benzoin*, another delightfully aromatic shrub.

Sassafras is an uncomplicated genus since there are only three species, one in Central China, one in Taiwan, and our own. Ours is *Sassafras albidum*, a medium-sized tree, occasionally getting as high as eighty feet but more frequently found growing as shrubs and small saplings in the undercover and at the edges of woods. Male and female flowers occur on different trees. As with so many trees, both kinds of flowers are small and undistinguished. The fruit eventually produced on the female trees is a dark blue oval drupe, borne on a scarlet stalk which is thickened at the end nearest the fruit from the union of the residual calyx lobes. The fruit is very tasty to birds, and provides a good winter staple for robins, catbirds, mockingbirds, brown thrashers and many of our other winter residents.

Is there any outdoor enthusiast, I wonder, who has not taught their children to look for the three varieties of sassafras leaves, all of which may occur on the same tree, and even on the same tiny seedling which perhaps only has a half a dozen leaves? The simplest leaf is a plain, pointed oval, "mitten leaves" have two unequal lobes, "hand and thumb," and may be right or left-handed, while "three-fingered leaves" have a large central, and two smaller side lobes.

Oil of sassafras, distilled from the bark, roots and twigs, is used in the manufacture of flavoring extracts, soaps, perfumes and medicines. Actually, its medical properties were somewhat overrated in colonial times

Illustration by Lucille Walton

and early settlers had hopes of great fortunes from the exploitation of sassafras — fortunes which never materialized. It was one of the first American plants to be introduced into Europe, probably on the tide of these hopes.

However, sassafras tea has been brewed in the South since earliest times. We use the roots, well washed, and boiled until there is enough dark reddish liquid to flavor (with lemon if desired, some people use no extra flavoring), sweeten, dilute and serve. The Indians used to mix sassafras with the sap of maple sugar trees, which must have made a delicious drink. Country people made beer by allowing an infusion of boiled twigs and molasses to ferment. The young leaves and pith are highly mucilaginous and, when dried and powdered, form the gumbo "filet" of the Deep South which is used to thicken and flavor soups and stews. The method of preparation was learned very early by white people in the South from the Choctaw Indians. Sometimes the powdered "filet" is simply put on the table in a shaker and used like salt and pepper. Readers should be cautioned that large amounts of oil of sassafras can produce a narcotic effect, although I cannot really imagine anyone taking in that much sassafras tea!

No one seems sure where the word sassafras came from. The plant was probably called something like that by the Indians, and the name was passed orally to the first immigrants who adopted it and handed it down. Just as the name has always been here, so has the plant, or at least for a very long time. Very recognizable sassafras leaves appear in the fossil record as early as the Upper Cretaceous, that it, about 100 million years ago. And from the appearance of most woods and thickets in Virginia from April throughout the summer, sassafras intends to be with us for a long time to come.

BY JOHN W. TAYLOR

The Whimbrel

It's a warm breeze, early in May, that drifts across the dunes. But the beach grasses show still the russet ochres and browns of winter; there is hardly a hint of new, springtime green.

Now the coastal marshes and beach flats hold a special allure. For these few weeks mark the northward passage of the whimbrel or Hudsonian curlew along the mid-Atlantic. Its cry lends to the salt meadows a spirit of wildness not there at other seasons. It's a voice that calls to mind lovely, far away places.

From Brazil or Chile, the birds may have come, or from the West Indies. Perhaps from the wide sands of the Gulf Coast. Bound they are for James Bay or Hudson's Bay in northern Canada, where they nest. (They are part of the eastern population of this species; western birds breed in Alaska and the Northwest Territories.)

Keeping to the coast, they follow the barrier beaches and adjacent marshes through Georgia and the Carolinas to the Delmarva and New Jersey peninsulas. The pace followed depends on weather conditions and the food supply. Several leisurely days of feeding — almost exclusively on the little fiddler crabs — are followed by flights of several hundred miles, when the urge to move coincides with the right wind and weather.

Seldom are these migratory flights witnessed. Usually it is dusk when the birds set out, forming tight bunches and attaining heights not reached during the routine flights to feeding grounds. A thrilling spectacle it is, seen against the fading light of the setting sun, the plaintive calls echoing over the darkening marshes.

Such flights occur in mid-May along the lower Chesapeake and Delaware Bays. At these confluences, many whimbrel strike out for the interior, following a northwesterly course. And once they leave the coast, they seem to make straight for their northern homes, via the Great Lakes region.

The few observations of spring whimbrel in the interior indicate that they fly all the way non-stop, to the nesting region. All of the records for Lake Ontario are of birds in flight, migrating overhead. Such distances on a single flight would not be unusual for the curlew, considering the long oversea routes taken in the fall to reach South America.

The autumn movement south follows a different route. Eastern birds cross the Ungava peninsula from central Canada, to the Gulf of St. Lawrence, thence to the Maritimes. The majority then make a long over-water crossing to the Jersey and Delmarva shores, by-passing New England. Unfavorable weather forces them inshore at times to Cape Cod and Long Island.

By mid-July they are back on the Virginia barrier islands, having completed nesting in the short arctic summer. Upon their return, whimbrel seem fewer and more scattered, perhaps because the journey south is a more leisurely one. By September, most have moved on; only a very few linger, some even into the winter. The Cape Charles Christmas count has listed them several times.

Some texts describe the whimbrel as tame, easily approached. That is certainly not the case while the birds are in Virginia and the Carolinas. Wary and suspicious, they move away at the slightest human intrusion.

Such vigilance may account for their relative abundance today. A close relative, the eskimo curlew, flies near the brink of extinction, largely because of over-hunting during the market gunning days. Trusting, easily decoyed, they were killed by the basketful. Smaller than the whimbrel, the eskimo curlew was once a common fall migrant in Virginia.

Another curlew, the long-billed, once migrated through our area with regularity: the long-billed curlew. Ornithologists once recorded it as more common than the whimbrel now, it is of very rare occurrence in the East. Destruction of its prairie breeding grounds contibuted to its demise.

Larger, long-billed and browner than the Hudsonian, the "sickle-bill" would be readily recognized. Closer to our whimbrel is the European whimbrel, which has visited our east coast several times during recent years, though it has not been noted in Virginia. Its white rump, lacking on the American bird, is distinctive.

So, identification of the curlews should not cause any difficulty. Yet pioneer ornithologist Alexander Wilson seems to have confused them. His description of the "esquimaux" curlew seems, at least in part, to be that of the whimbrel or Hudsonian curlew. He nevertheless gives a stirring account of the birds as they passed on the New Jersey coast, two centuries ago.

Both names, whimbrel and curlew, are supposedly derived from the birds' call-notes.

MARYLAND YELLOWTHROAT
PRAIRIE WARBLER
REDSTART
KENTUCKY WARBLER
YELLOW-BREASTED CHAT
PROTHONOTARY WARBLER
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